

**Task Order CPO5
Statement of Work (SOW)
“Corrosion Sciences Education Distance Learning Curriculum Development”
14 May 2014**

1 GENERAL DESCRIPTION

1.1 Summary. Sabreliner Aviation LLC and the Center for Aircraft Structural Life Extension (CASTLE) at the United States Air Force Academy (USAFA) requires support from the University of Florida to develop critical training and education materials in science, technology, engineering and mathematics—commonly referred to as STEM. Understanding how to prevent and mitigate corrosion requires an understanding of physics, chemistry, material science and math. At its most basic, a metal being corroded acts as an anode; the metal is oxidized, forming metal ions and free electrons. Understanding the interaction of ions and electrons then requires understanding these educational disciplines. STEM educated students have a greater understanding of basic mechanisms of material degradation and are therefore better equipped to understand issues associated with CASTLE’s sustainment mission. Therefore CASTLE requires the development of a distance learning curriculum in physics, chemistry, material science, and other disciplines which could facilitate a better understanding of corrosion phenomena. The targeted students are in their first two years of college as well as advanced high school students in the 11th and 12th grade who have demonstrated college readiness. The development effort and completed courses for this requirement must satisfy a number of objectives as described in paragraph 2.

1.2 Background. Effective corrosion prevention and mitigation across the DoD depends as much on culture change as on the successful implementation and application of a broad range of technical processes, policies and procedures. Successful culture change in turn depends variously on understanding corrosion to include technical aspects such as initiation, growth mechanisms, and environmental and stress effects on corrosion-prone materials.

A major component of any culture change is education and training. Education and training in effective corrosion prevention and mitigation processes and techniques is vital to the success of the overall CPC Program. These processes and techniques are broad and varied. More importantly, their successful implementation is deeply rooted in the fundamentals of understanding corrosion and materials. For pervasive cultural change to truly take place, education and training must allow current and future DoD employees to understand the science behind corrosion.

Historically the largest corrosion related return on investment usually stems from prevention. Corrosion can be prevented or contained through judicious selection of materials, thoughtful design of equipment and facilities and careful development of production and assembly processes. Therefore program managers, system engineers, acquisition logisticians, and facility engineers need to thoroughly understand the impact of corrosion-related decisions during the early acquisition process and be educated and trained to conduct effective analyses and trade-offs to minimize life-cycle costs and maximize operational readiness in the context of corrosion maintenance requirements. Having a fundamentally firm grasp of the science behind corrosion strengthens the ability to conduct effective analyses and make sound trade-off decisions. Clearly, education, training and indoctrination in the principles and specific methods of corrosion prevention and mitigation are essential to achieve a long-term cultural change. Education in science, technology, engineering and mathematics is commonly referred to as STEM. To affect a cultural change across the DoD with regard to corrosion prevention and mitigation, having a STEM trained workforce is an imperative.

It's estimated that in 2011, some 26 million US jobs required in-depth knowledge in at least one of the STEM fields. The Brookings Institution report titled "The Hidden STEM Economy", states that "Half of all STEM jobs are available to workers without a four-year college degree, and these jobs pay... 10 percent higher than jobs with similar educational requirements." There are other numerous reports, studies and debates about the lack of STEM education in the US. Given the potential long-term effect to the DoD workforce, helping address this issue will in turn help ensure availability of STEM qualified employees for the DoD years into the future.

This task directly supports CASTLE's mission to actively support CASTLE training and/or education of individuals and organizations not located at USAFA. Such individuals and organizations may include, but are not limited to, agencies of the Federal Government, agencies of State and Local governments, education institutions (K-12, undergraduate, graduate, trade schools, etc.), charitable and not-for-profit organizations, and foreign organizations (both government and nongovernment). The delivered products from this task will be of significant contribution to USAFA cadet curriculum, future USAF officers, and be of direct benefit to such cadet courses as;

- All engineering mechanics courses in the field of structures and materials
- Mech Engr 491/492. Capstone Design Project
- Mech Engr 499. Independent Study for Mechanical Engineering majors
- As well as numerous courses in the Management and Systems Engineering major

1.3 Basic Contract and SOW. Definitions of terms specific to this document or to the Aging Structures program can be found in the basic contract. Where specific tasks, terms, or conditions in this SOW and contract/contract clauses conflict, this SOW governs.

1.4 Scope. The period of performance (PoP) for this project is eighteen (18) months commencing at Task Order award.

2 DESCRIPTION OF TASKS

The following paragraphs describe the task in detail.

2.1 Phase 1—Survey. Recognizing that other existing virtual, online distance learning courses likely exist in and are offered to students across the nation in many states, University of Florida will begin this task by conducting a survey and analysis of these courses. University of Florida will prepare a survey summary report which includes the analysis of not less than three (3) such courses. University of Florida will carefully consider the results of the analysis and include recommendations which meet the objectives of this task. Recommendations will include at minimum; instruction technology, curriculum approach, and anticipated instructional efficiency (i.e. the anticipated number of students in the subject population which may be reached over a Contractor specified period of time) using the recommended approach. University of Florida will specifically detail how curricular elements and presentation methods in courses developed in this task would be unique and materially different from currently available courses.

2.2 Phase 2—First Course Curriculum Design and Development. University of Florida will develop one (1) distance learning course in either the physics field, the chemistry field, or the material science field which satisfies the overall goal of this task as stated in the paragraphs of section 1 as well as the following specific objectives (reference 2.2.1 through 2.2.7). University of Florida will recommend to Sabreliner and the CASTLE Government Technical Lead (GTL) the most

appropriate field for this course and how this sequent would be supportive of two subsequent courses.

2.2.1 Presentation methods. From a student perspective, the presentation of each course should place an emphasis on high quality production value to be engaging to the targeted student population. University of Florida will, where possible, consider interactive methods, and include instructional elements which might creatively encourage further study of other related STEM courses.

2.2.2 Course Content. Referencing the task goals stated in the paragraphs of Section 1, the courses developed in this task will address the areas of physics, chemistry and material science in order to provide an understanding within the candidate student population of how to prevent and mitigate corrosion. Accordingly, the content of the developed courses will include, as their focus, appropriate aspects of material sustainment, corrosion prevention and corrosion mitigation. The content in the developed courses will encourage students to explore broad careers opportunities within STEM related fields as well as advanced education opportunities.

2.2.3 Course Description.

a. General. For the course to be developed, University of Florida will propose to Sabreliner and the GTL for approval; a course description suitable for a course catalog, the course goal and assessable course objectives.

b. Specific. Following approval of the proposed description, goal, and objectives for each course (reference paragraph 2.2.2a), University of Florida will develop detailed lesson content described by means appropriate to the proposed instructional method (lesson plans, storyboards, multimedia plan, etc.). Each of the developed courses will also include any additional materials typically required to satisfy public education criteria such as testing/assessment material, and teacher instructional aids and administrator guidance.

2.2.4 Students. University of Florida will describe the expected number of candidate students as part of the entire population of students. This description will include expected qualifications which should be required of the candidate students. The candidate students should include both civilian university and service academy students.

2.2.5 Outreach and Communications.

a. Candidate Student Outreach. Whereas knowledge of course availability, content, prerequisite requirements, et cetera will be essential to ensuring any developed course is taken and completed by candidate students, University of Florida will develop an approach or approaches for making candidate students aware of the opportunity to take a developed course(s). University of Florida will describe how the developed curriculum and instructional approach provides opportunities to take the course(s) developed in this task in lieu of existing courses. Where such course replacements are applicable, University of Florida will describe examples of university credit hour systems, points of contact, program timing, and other relevant course substitution requirements.

b. Course Outreach. Recognizing it is the intent of the GTL and CPO to make any developed courses widely available across the nation; University of Florida will consider, explore and include recommendations for offering completed courses in as many states as possible. A thorough review

and analysis of the issues for exporting developed courses will be addressed appropriately in an end of project summary report.

2.2.6 Accreditation Standards. In order to ensure the developed courses may be widely applicable across the requirements of the candidate population, University of Florida will develop the distance learning course per a consistent set of state and/or national accreditation standards. Accreditation standards to be considered should include at minimum; University of Florida's state resident state course accreditation requirements for credit at the university or college level, North Central Association of Colleges and Schools (www.northcentralassociation.org) accreditation standards, and ABET (www.abet.org) accreditation standards. University of Florida will recommend to GTL for approval which accreditation standards will be used in this task.

2.2.7 Metrics. Measurement of success in this and any future similar STEM course development is critical to the continuous process improvement common in national public education. Such course/curriculum assessment is facilitated by relevant data and metrics. University of Florida will develop success criteria and other metrics appropriate to course assessment. Success criteria should include, but not be limited to number of students taking a developed course, student course completion rates, and number of public schools, colleges, and universities offering the course.

OPTION 1: University of Florida will propose and price separately the execution of Phase 2 (reference paragraph 2.2) in its entirety along with all associated deliverables on one (1) additional (second) course which complement the first course development. Exercising this option will result in the development of two (2) courses which form a consistent circular outcome to meet the overall objective of this task when offered in concert with the first course.

OPTION 2: If accepted, this option will only be exercised in combination with Option 1. University of Florida will propose and price separately the execution of Phase 2 (reference paragraph 2.2) in its entirety along with all associated deliverables on one (1) additional (third) course which complements the first and second course development. Exercising this option will result in the development of three (3) courses which form a consistent circular outcome to meet the overall objective of this task when offered in concert with the first course.

3 DELIVERABLES

3.1 Interim Deliverables. The following deliverables will be submitted in draft form and be subject to Sabreliner/GTL review and approval. The GTL has responsibility to coordinate review with CPO. Where approval of a deliverable is required to begin a subsequent task, University of Florida should plan a minimum of fifteen (15) working days for Government review and comment.

- a. Monthly status reports due no later than the 5th day of the month addressing technical performance in a mutually agreed to format defined after contract award. Status reports should highlight any technical issues to Sabreliner and the GTL which may impact cost, schedule of performance in the delivery of the completed course(s).
- b. Phase 1—Survey report.
- c. Proposed description, goal, and objectives for each course (reference paragraph 2.2.2 a). This delivery should include a notional production and delivery schedule making particular note of any dependencies.

- d. Recommended accreditation standards (reference paragraph 2.2.6).
- e. One (1) fully developed course satisfying the objectives described above with all appropriate and related materials typically used to satisfy public education criteria such as test material, teacher/administrator instruction or guidance.
- f. Quarterly status reports (due Quarterly based on the calendar year on the 5th day of the appropriate month) addressing technical performance in a mutually agreed to format defined after contract award. Status reports should highlight any technical issues to Sabreliner and the GTL which may impact cost, schedule of performance in the delivery of the completed course(s).
- g. Monthly Master Schedules due no later than the 5th day of the month (including percent complete by major task order objectives)
- h. Status update reports and minutes for Program Review Meetings and interim project meetings (as required)

3.2 Final Report (CDRL A006). A draft final report will be delivered to Sabreliner and the GTL not later than 50 days prior to the end of the PoP.

- a. The final report will include development insights, lessons learned and recommendations. The report will also provide detailed specifications of all materials required to satisfy the course requirements not directly part of the student presentation material.
- b. The report will also make specific detailed recommendations related to outreach and communication. Where the CPO is interested in having these developed distance learning courses available nationwide, University of Florida will make recommendations for CPO consideration for making prospective colleges, universities and other institutions of higher learning aware of the courses and their availability for use.
- c. Sabreliner and the GTL will have 15 days for review and comment after draft delivery for University of Florida's consideration in preparing the final report deliverable.

4 GOVERNMENT PROPERTY

There will be no government property furnished under this task.

5 REQUIRED TRAVEL

University of Florida will propose appropriate CONUS travel during the performance of this task to include technical performance progress reviews. Wherever possible, Program Management Reviews should be held in conjunction with quarterly CPO Forums.